

INSECT DISEASE REPORT



USDA FOREST SERVICE/NORTHERN REGION

Report No. D-72-2

5200
December 1972

SOME DISEASES OF ORNAMENTAL PLANTS IN MONTANA^{1/}

by

Oscar J. Dooling
Supervisory Plant Pathologist

FIREBLIGHT

Fireblight is probably the most destructive disease of apples, pears, hawthorn, *Spirea*, *Cotoneaster*, junberry, mountain ash, and related plants. A bacterium, *Erwinia amylovora*, causes fireblight. It is usually characterized by sudden wilting followed by a shriveling and blackening of the flowers and young shoots. The affected parts look as though they were scorched by fire, hence the name "fireblight." The disease spreads from the terminals down into the main limbs and trunk and forms dark, sunken cankers. These cankers enlarge and may girdle the limb. Bacteria overwinter in cankered limbs. Large numbers of bacteria are produced in sticky amber-colored droplets on the cankers in the spring. Insects and rain carry the bacteria from the droplets to the flowers and twigs. Disease development is favored by a combination of warm temperatures (70 to 85° F.) and high humidity created by rain, fog, or irrigation. Dry weather usually prevents new infection and retards existing infection.

Reduction of damage requires a combination of practices. Prune out and burn diseased twigs and branches during the summer. Cut 6 inches below the edge of the infected area. Sterilize the cutting tools and cut surface after each cut with a 5 percent solution of either Lysol or Clorox. Avoid excessive nitrogen fertilization and heavy watering where fireblight has been a problem. Flowers are the most susceptible part of the plant, and they may be protected from infection with the antibiotic Agri-strep, a 37 percent streptomycin sulfate formulation.^{2/} First application should be made at or before 10 percent bloom and repeated at 4- to 5-day intervals until late bloom is completed. Use 2.24 ounces per 100 gallons of water.

^{1/} Presented at the Montana-Wyoming Turf and Nurseryman's Association Winter Meeting held at Billings, Montana, December 1, 1972.

^{2/} All pesticide formulations recommended in this report are registered by the Environmental Protection Agency.

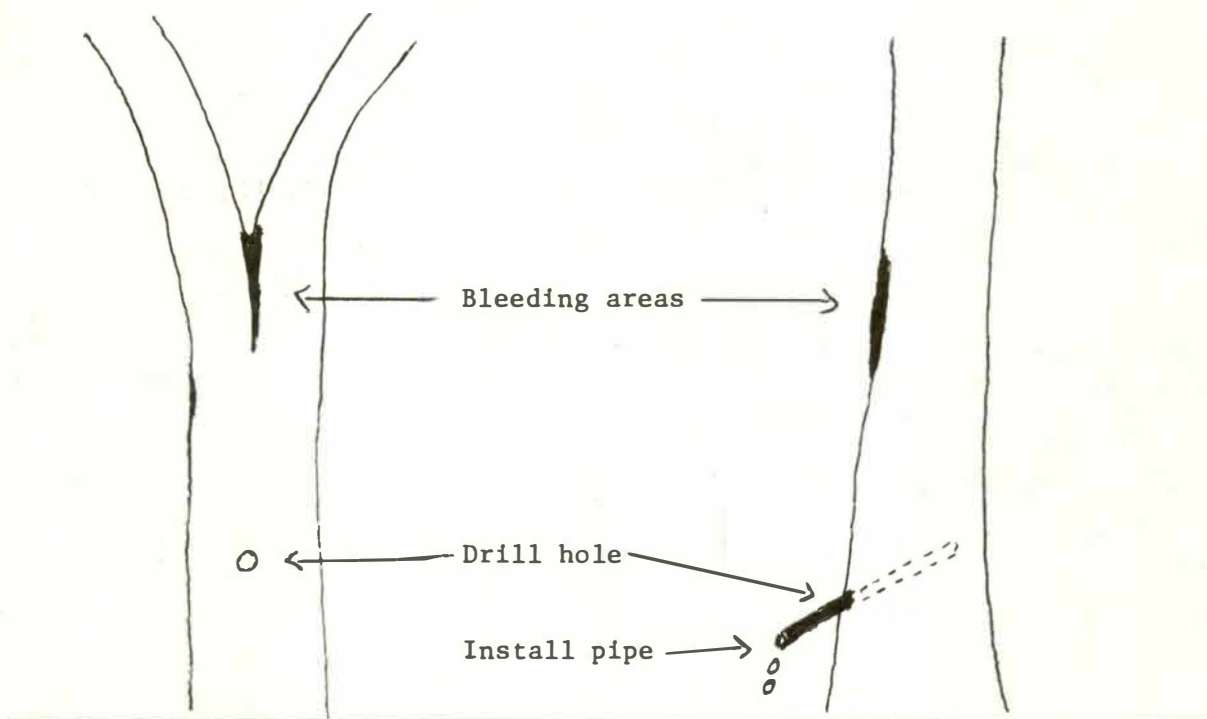


ELM WETWOOD (SLIME FLUX)

Wetwood is the name given to the chronic bleeding from crotches and wounds on elm. The cause of the bleeding is believed to be a bacterium (*Erwinia nimipressuralis*) causing fermenting of the sap. This fermentation causes gas pressure of from 5 to 60 pounds per square inch to develop inside the tree (normal pressure is about 1 p.s.i.). Because of this high pressure, cracks develop in crotches or wounds. Sap that oozes out of the tree retards or prevents callus formation and frequently kills the cambium below the bleeding area.

Installing a drain will prolong the life of infected trees. Install the drain at the lowest point of the diseased area, directly beneath the wound. Bore a one-half inch diameter hole into the tree to within an inch or two of the far side. Slant the hole slightly upward to facilitate drainage. Drive a short section of pipe into the hole just far enough to hold it securely. The pipe will carry the toxic sap from the tree and prevent any further killing of the cambium.

Where and how to install drain:



ROSE POWDERY MILDEW

A fungus, *Sphaerotheca pannosa*, causes powdery mildew of rose. An early symptom is a tendency of the younger leaves to curl, exposing the lower surface. A whitish-gray, powdery or mealy coating covers the leaves,

flower buds, and young stems. The fungus causes stunting, reduced vigor, and reduced blooming. Cane tips and flower buds may be distorted and killed. Infection occurs most readily when the air is saturated with moisture.

As soon as roses have been pruned in early spring, spray the dormant plants with lime-sulfur, 1 gallon to 15 gallons of water. During the growing season mildew can be held in check by weekly sprays of lime-sulfur. Do not apply spray when air temperature is over 85° F.

VERTICILLIUM WILT OF ELM

A fungus, *Verticillium albo-atrum*, causes this disease. The symptoms of verticillium wilt are much like those of Dutch elm disease (see writeup of Dutch elm disease), and cultures of the fungi are necessary to distinguish between them. This disease may in time cause the death of large elms, but usually does not become epidemic. The fungus is a soil organism, and the disease spreads upward from the roots.

No direct control is available, but fertilizing mildly infected trees may aid recovery. When infected trees wilt extensively, they should be cut down and burned with as many roots as possible being destroyed. Pruning infected branches on lightly infected trees may also aid in recovery.

CEDAR-APPLE RUST

This leaf rust disease of juniper and apple or hawthorn is caused by the fungus *Gymnosporangium juniperi-virginiana*. On juniper, it infects leaves and stimulates them to form chocolate-brown globular to irregular-shaped corky galls one-eighth to 2 inches in diameter. These galls appear attached to the twigs and mature the second spring after leaf infection. During rainy periods in the spring, they develop gelatinous, finger-like orange spore horns. As these spore horns dry up, the galls become woody and dark brown to black. Spores produced on the spore horns infect leaves of apple and hawthorn causing orange spots. Spores produced on these spots infect leaves and twigs of juniper in late summer.

Since cedar-apple rust requires juniper and apple or hawthorn as alternate hosts, these hosts usually should not be grown within a mile of each other. Where both hosts are growing together, they can be protected by fungicidal sprays during two periods of the year. The first period is when the spore horns appear on the cedar galls; the other is in late summer when the orange spots appear on the apple or hawthorn leaves. An application of 4-4-50 bordeaux (4 pounds of copper sulfate and 4 pounds of hydrated lime in 50 gallons of water) during the first period will kill the gelatinous horns and prevent spore production. Wettable sulfur (3 pounds in 100 gallons of water) applied during the second period will protect junipers from spores produced on apple or hawthorn leaves.

FOLIAGE DISEASES OF GREEN ASH AND COTTONWOOD

Green Ash

1. Leaf spot (anthracnose).--*Gloeosporium aridum* causes large irregular brown spots usually along leaf edge. Leaves fall prematurely. Other fungi that cause similar leaf spots are *Cercospora fraxinites*, *Cercospora lumbricoides*, *Cercospora texensis*, *Cylindrosporium fraxini*, *Mycosphaerella effigurata*, *Phyllosticta fraxinicola*, *Septoria besseyi*, *Septoria leucostoma*, and *Septoria submaculata*.

No direct control is available, but raking and burning fallen leaves is usually sufficient to keep these leaf-spot diseases at a minimum.

2. Leaf rust.--*Puccinia sparganioides* conspicuously distorts the leaves and causes a swelling of the twigs. The spores, a yellow powder, appear on the swollen areas. These spores are incapable of reinfecting ash, but infect several species of grass.

The disease is rarely destructive enough to warrant special control measures. Raking and burning fallen leaves will keep leaf rust damage at a minimum.

Cottonwood

1. Leaf-blister.--*Taphrina aurea* causes brilliant yellow to brown blisters of varying sizes to appear on leaves after extended periods of cool, wet weather.

No direct control is available; raking and burning fallen leaves will normally hold leaf-blister in check.

2. Leaf spots.--*Marssonina populi* produces brown spots with a darker brown margin on leaves. It causes premature defoliation and twig dieback. Other fungi that cause leaf spots are *Ciborinia bifrons*, *Ciborinia confundens*, *Mycosphaerella populicola*, *Mycosphaerella populorum*, *Plagiostoma populi*, and *Phyllosticta alcidis*.

Gather and burn all fallen leaves to remove the source of inoculum.

3. Leaf rusts.--*Melampsora medusae* and *Melampsora abietis-canadensis* produce yellowish-orange pustules on lower leaf surfaces. The alternate host of the former is larch, and that of the latter, hemlock. Two other leaf rusts are caused by *Melampsora albertensis* and *Melampsora occidentalis*.

Leaf rusts rarely cause enough damage to necessitate special control measures. Where continual and heavy infection occurs, larch and hemlock should be separated at least 100 yards from the cottonwoods.

4. Powdery mildew.--*Uncinula salicis* causes a common superficial disease appearing as a white mildew on both sides of the leaves; usually the damage is not serious.

Spray with wettable sulfur if the specimens are valuable and the disease is serious.

DUTCH ELM DISEASE

Dutch elm disease is caused by the fungus *Ceratocystis ulmi*. The first symptoms are a yellowing, wilting, and browning of leaves on individual branches. Stripping the bark from these branches reveals brown streaks in the sapwood; cross sections show circles or rings of brown spots. The spread of the fungus from the point of entry is rapid; the tree may die in one season. The fungus develops under the dead bark. The smaller European elm bark beetle, *Scolytus multistriatus*, develops on the dead wood beneath the bark and carries the fungus to the young growth of healthy elms, and by feeding in the crotches, inoculates the healthy trees. (The smaller European elm bark beetle has not been reported in Montana as of December 1972. Both the beetle and the disease occur in the Dakotas, Wyoming, and Idaho.)

Effective control of Dutch elm disease involves three different but related programs:

1. Community-wide sanitation designed to eradicate elm bark beetles. This involves the destruction of all dead or dying elm wood present in the community. This means limbs hanging on trees that may have been damaged by storms, trees that are old or weakened by insects or other diseases, or wood stacked for fireplace use.
2. Prevention of spread through natural root grafts from infected to healthy trees. This involves creating a barrier between diseased and healthy trees by severing or killing the roots. This can be done by mechanical trenching (watch out for underground pipes and cables), or through the use of a chemical such as Vapam. Drill 1-inch diameter holes 24 inches deep and 6 inches apart along lines between the trees. Fill the holes with the chemical and seal to prevent loss of fumes.
3. Chemical protection to prevent healthy trees from being inoculated by beetles during their feeding period. A dormant spray of an emulsifiable concentrate of methoxychlor will prevent beetle inoculation of healthy trees. For use in hydraulic spray equipment, dilute with water to make a spray containing two percent methoxychlor by weight. For use with mist blower equipment, a 12 percent spray may be used. Make sure all bark surfaces are covered.

PESTICIDES PRECAUTION STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key -- out of the reach of children and animals -- and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U.S. Department of Agriculture, consult your county agricultural agent or State Extension specialist to be sure the intended use is still registered.



Use Pesticides Safely
FOLLOW THE LABEL

U.S. DEPARTMENT OF AGRICULTURE